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KANSAS CITY
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Inter-Departmental Communication
Office of the City Auditor

Date: May 4, 2011

To: Honorable Mayor and Members of the City Council

From: Gary L. White, City Auditor

Subject: Performance Audit of the Kansas City Street Lighting Program

We conducted this audit of the city's streetlights under the authority of Article II, Section 216 of the Charter of Kansas City, Missouri, which establishes the Office of the City Auditor and outlines the city auditor's primary duties.

A performance audit provides assurance or conclusions based on an evaluation of sufficient, appropriate evidence against stated criteria. Performance audits provide objective analysis so that management and those charged with governance and oversight can use the information to improve program performance and operations, reduce costs, facilitate decision making, and contribute to public accountability.[1]

We shared a draft report with the director of public works on April 15, 2011. We appreciate the courtesy and cooperation of the Public Works and Information Technology staff throughout the audit. The audit team for this project was Jason Phillips and Deborah Jenkins.

OBJECTIVE

Our objective was to determine what percentage of the city's streetlights are illuminated after dark.

CONCLUSION

The city is effective at keeping streetlights illuminated. Almost 99 percent of streetlights in the city are illuminated after dark.

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[1] Comptroller General of the United States, *Government Auditing Standards* (Washington, DC: U.S. Government Printing Office, 2007), p. 17.

WORK PERFORMED

Our audit methods included:

- Interviewing Public Works staff to learn how the city identifies non-working streetlights and handles streetlight maintenance and repairs.
- Meeting with Information Technology staff to learn how the streetlights are mapped in the city's Geographic Information System (GIS).
- Reviewing budgets to learn how much the city spends annually on streetlights.
- Reviewing the contract between the city and the streetlight maintenance contractor to understand contract requirements.
- Reviewing streetlight literature and audits of streetlights from other jurisdictions to find out whether there are industry benchmarks for the percentage of streetlights that should be illuminated.
- Randomly selecting 11 sections in the city limits and observing 1,435 streetlights after dark to see whether they were illuminated.

We conducted this performance audit in accordance with generally accepted government auditing standards with the exception of reporting the views of management concerning the audit because we make no recommendations. We do not believe the absence of a response affects the audit results.

Government auditing standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. No information was omitted from this report because it was deemed privileged or confidential.

BACKGROUND

The Public Works Department operates the city's street lighting program. Lighting streets helps drivers and pedestrians stay safe at night and enhances the security of the general public. Street lighting is also associated with certain economic and social benefits such as reducing nighttime accidents, aiding the police, facilitating traffic flow, and promoting business during nighttime hours. The city owns approximately 91,500 streetlights.

The city spends about $19 million annually on its street lighting program, including more than $4.5 million for electricity for the streetlights and about $3.7 million for a contractor to provide routine maintenance on streetlights and to repair outages or malfunctions.

ANALYSIS

Of the 1,435 streetlights we observed, almost 99 percent were illuminated after dark. In a two-week period in March, auditors observed streetlights in randomly selected areas of the city and recorded the pole numbers of those that were not illuminated. Eighteen of the 1,435 streetlights observed were not illuminated.[2] In addition to the 18 non-illuminated streetlights, we identified 5 that were not consistently illuminated – they were blinking off and on. According to Public Works staff, lights that are blinking off and on indicate the streetlight lamp is beginning to fail. While we recorded the streetlights we observed blinking off and on, we did not include them in the non-illuminated count.

SAMPLING AND TESTING METHODOLOGY

We obtained an electronic streetlight database from the Public Works Department to determine the total number of streetlights the city owns and calculated a statistically valid sample size of lights that would result in a confidence level of 95 percent at or below a +/-3.0 percent margin of error. We generated a random sample of 11 sections in the city.[3] Five of the sections in our sample were north of the river and six were south of the river. The sampling method provided a statistically valid representation of the city.

We obtained maps of the 11 sections using the city's Geographical Information System and Google Maps. A route within each section was judgmentally selected.[4] We assigned audit staff to observe streetlights on the selected routes after dark. Staff were instructed to count the total number of lights in their assigned area, and to document the ID tag numbers for streetlights which were not illuminated or were blinking off and on.[5]

During a two-week period in March, staff from the City Auditor's Office examined 1,435 streetlights. This sample size provides a 95 percent confidence level and a margin of error of up to +/- 2.57 percent. This means that out of 100 samples drawn in the same manner, we would expect 95 to yield results within the specified error range.

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[2] We reviewed streetlight literature and related websites, talked with a representative of the American Public Works Association, and asked city staff in the Public Works Department for an industry benchmark against which we could compare these results. There are benchmarks for other streetlight–related performance measures, but no benchmark for what percentage of non-illuminated lights is acceptable.

[3] A section is generally a one-square-mile block of land.

[4] The audit team designed the routes to provide coverage of both residential and commercial areas of the sections. Because observers might need to park and step out of their vehicle to get the pole number of a non-illuminated or blinking streetlight, we also designed the routes to minimize potentially dangerous areas such as highways.

[5] We reported the lights that were not illuminated after dark or were blinking off and on to the 311 Action Center for repair.